

**Release Abatement Measure
Completion Report
Former Nu-Style Facility – 87 Grove Street
RTN 2-16694**

Town of Franklin, Massachusetts

April 2013



317 Iron Horse Way
Suite 204
Providence RI 02908

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1 Introduction

This document is intended to provide a *Release Abatement Measure (RAM) Completion Report* in accordance with the requirements of the Massachusetts Contingency Plan (MCP), Title 310 of the Code of Massachusetts Regulations (CMR) Section 40.0446. In May 2012, Fuss & O'Neill, Inc. (Fuss & O'Neill) submitted a RAM Plan for soil remediation activities at the site in accordance with the MCP (310 CMR 40.0440), on behalf of the property owner, the Town of Franklin (the Town). The purpose of the *RAM Completion Report* documented herein is to document the response actions completed at the site and the completion of activities under the *RAM Plan*.

The Town took ownership of the property via tax-title foreclosure in 2005 after the previous property owner and other entities defaulted on the property. Therefore, the Town is undertaking response actions at the site as a “municipality with exempt status” as defined in Massachusetts General Laws, Chapter 21E, Section 2.

Refer to *Section 5* for Fuss & O'Neill's Limitations of Work Product.

2 Site Conditions

2.1 Site Identification and History

The subject site is an approximately one-acre parcel located on the western side of Grove Street in Franklin, Massachusetts (Norfolk County) and identified by the Town as Tax Assessor's Map 276, Lot 27. An abutting parcel, identified as Tax Assessor's Map 276, Lot 22, was operationally related to the subject site and was acquired by the Town under similar circumstances. However, due to funding constraints related to the federal grant funding the RAM activities, the activities being conducted under the May 2012 *RAM Plan* were restricted to Lot 27. Prior to May 2012, Lot 27 was occupied by a three-story, 12,000 square-foot wood-framed mill building with a partial basement. Lot 22 is currently occupied by a dilapidated 6,000 square-foot wood-framed mill building.

A portion of a United States Geological Survey (USGS) topographic map depicting the location of the subject property is provided as *Figure 1* and a site plan, depicting the boundary of the site and features pertinent to the activities proposed herein, is provided as *Figure 2*.

Both parcels were developed in approximately 1900, and utilized for a variety of industrial purposes through their history. The mill building on Lot 27 was initially constructed by a textile manufacturer (Norfolk Woolen Mills/Unionville Woolen Mills) and later operated by a paint manufacturer (Franklin Paint Company). From approximately 1969 to 1989, the site was utilized by Nu-Style, Inc. (Nu-Style) for the manufacture of costume jewelry. At least five underground storage tanks (USTs) with a total capacity of approximately 15,000 gallons of petroleum were utilized on-site during Nu-Style's ownership.

Nu-Style vacated the building in approximately 1989 and abandoned numerous containers of hazardous materials, as well as contaminated process equipment, on-site. In 1990, four of the USTs were removed. One heating oil UST remained in a bunker near the southwestern corner of the building. IES Inc. (IES),

an environmental consultant, conducted a series of preliminary investigations in accordance with M.G.L. 21E in the early 1990s on behalf of Nu-Style's creditors. One of the reports prepared by IES indicated that a reportable condition was present at the site due to the presence of chlorinated volatile organic compounds (VOC). However, the documentation was unclear as to whether this sample was collected from an adjacent parcel (currently identified as Map 276, Lot 26, located to the southwest of the site), rather than the aforementioned operational parcels. At the time of the IES investigation activities, Lot 26, as well as Lots 22 and 27, were part of a contiguous mill complex owned by Nu-Style.

In 1991, Mr. Richard Armstrong, President of Nu-Style, declared bankruptcy, and the property ownership defaulted to the Federal Deposit Insurance Corporation (FDIC). In 1992, MassDEP and Town personnel inspected the property and observed containers and process equipment containing potentially hazardous chemicals. MassDEP referred the discovery to the United States Environmental Protection Agency (USEPA), which conducted a Removal Action under the National Contingency Plan (NCP) at the site in 1992. The Removal Action included the removal of containers of chromic acid, cyanide, nickel sulfate, chlorinated solvents, lubricating oil and contaminated materials from the site and petroleum product from the remaining UST.

Following the completion of the Removal Action in 1992, the site was unmaintained and fell into disrepair. The Town acquired Lots 22 and 27, respectively, via tax-title foreclosure in 2002 and 2005.

2.2 Environmental Conditions

Between 2006 and 2010, Fuss & O'Neill completed a series of environmental assessment activities on the property on behalf of the Town. The following environmental conditions were identified at the site:

- One UST was located on the western side of the Lot 27 building and was removed in accordance with the Massachusetts Fire Code (527 CMR 9.00) in 2007.
- Metals, PAH and chlorinated VOC were present in soil at concentrations exceeding the MassDEP RCS-1 reportable concentrations.
- PAH were present in sediment in Mine Brook downstream of the site at concentrations suggestive of a possible on-site source and in excess of the Consensus-Based Threshold Effects Concentrations (TECs, which have been accepted by MassDEP as risk-based sediment criteria) indicating a potential risk to aquatic life.
- Lead and chlorinated VOC were present in overburden and bedrock groundwater at the site at concentrations greater than the MassDEP RCGW-2 concentrations.
- The building was structurally compromised and at risk of structural failure if not demolished safely, and contained hazardous building materials, including lead paint, asbestos, and polychlorinated biphenyls (PCBs) and diethyl hexyl phthalate (DEHP) in electrical components. Subsequent testing indicated that PCBs were additionally present in building materials (caulking and window glazing compounds) but the concentrations of PCBs did not trigger separate management requirements under the *Toxic Substances Control Act (TSCA)*.

In 2010, the Town was awarded a USEPA Brownfields Cleanup Grant for the site. Based on an *Analysis of Brownfields Cleanup Alternatives (ABCA)*, the Town elected to demolish and dispose of the building and remove soil containing metals, PAH and VOC. This alternative would improve soil conditions at the

site, mitigate the structural liability associated with the abandoned building, result in the preparation of a cleared site for possible future redevelopment and facilitate the installation of bedrock wells to evaluate the nature and extent of dissolved chlorinated VOC in bedrock.

2.3 Summary of RAM Plan

Fuss & O'Neill submitted a *RAM Plan* to MassDEP in May 2012. The following project approach was summarized in the *RAM Plan*:

- Erosion and sedimentation controls would be installed at the site in order to mitigate impacts to the adjacent Mine Brook in accordance with an Order of Conditions issued by the Town's Conservation Commission. The controls would include wattles to retain sediment and a scaffolding structure erected over the brook to prevent demolition debris from falling into the brook.
- The building would be demolished and components segregated for off-site disposal. This activity required a waiver from MassDEP, as the building was structurally unsound and not suitable for interior abatement prior to demolition. Asbestos-containing materials would be disposed off-site, while salvageable materials (metal, structural timbers, etc.) would be salvaged by the demolition contractor and clean brick, concrete and masonry materials would be staged on-site for crushing and reuse in accordance with the MassDEP "Asphalt, Brick and Concrete" (ABC) reuse policy.
- Following the completion of building demolition and disposal, soil containing lead and chlorinated VOC would be excavated and staged on-site. The soil would be characterized for off-site disposal in accordance with the MCP, and confirmatory samples would be collected to document the post-excavation soil conditions at the site and support future risk characterization activities.
- The site would be backfilled and stabilized using fill material imported from off-site sources in accordance with the anti-degradation standard at 310 CMR 40.0032(3). Additionally, the southern foundation wall of the former mill building would be supported by a concrete gravity wall and retained for its historical value.

Building demolition activities began in May 2012, under a *Segregation and Demolition Plan* (SDP) prepared by Fuss & O'Neill EnviroScience, LLC (EnviroScience) and approved by MassDEP Central Region under waiver C-AW-12-181. Activities related to the soil management conducted under the RAM commenced in August 2012.

2.4 Additional Conditions

In May 2012, during demolition of the former building conducted under the SDP, a stone-lined underground tunnel approximately eight feet wide was identified in the northern portion of the building, in an area which had been previously identified as a slab-on-grade section of the structure. The closure of this structure was conducted during the execution of RAM activities at the site and is described in further detail below.

The tunnel was an east-west trending buried structure which was observed during demolition to extend

approximately 150 feet across the site, ending on its eastern end at the western edge of a slab-on-grade addition at the northeastern corner of the former building. Based on Town records, this addition was constructed in 1978, and therefore, the tunnel was inferred to have been closed at its eastern end no later than the late 1970s. In approximately the 1960s, Grove Street was developed in its current alignment, which, based on historical mapping, modified the Mine Brook Reservoir to the east of the site and likely blocked the inlet to the structure. The western end of the tunnel terminated in the basement of the Lot 22 building and did not have a hydraulic connection to Mine Brook. While standing water was observed in the structure, the depth of water generally coincided with on-site groundwater depths and was not the result of a direct hydraulic connection to a surface water body. Therefore, the saturated granular material is referenced herein as “sediment” for convenience to distinguish the material from the “soil” originally planned for removal from the site under the RAM.

The “sediment” described herein was not located within the confines of a surface water body or at the bottom of a pond, stream, or river, and does not meet the definition of sediment contained in 310 CMR 40.0006. Based on analytical data compiled in July 2012 by Fuss & O’Neill, this media contained concentrations of PAH which would have potentially posed a risk to future site users and was inconsistent with concentrations of PAH identified in fill material elsewhere at the site.

Regardless of the specific regulatory definition of the material, the LSP-of-record deemed that removal of the material during the RAM activities was the most prudent and cost-effective manner to reduce potential risks posed by the material and was necessary to complete the objectives of the RAM Plan. Completion of RAM activities included backfilling and grading over the former tunnel structure area. As the material buried in the former raceway was exposed during the RAM building demolition activities, and final backfilling and grading of the site was necessary to complete the RAM, the LSP-of-Record deemed that the benefit of removing the material as part of the RAM activities was most feasible prior to backfilling. Removal of the material as part of the RAM, while unforeseen during the planning of the RAM, was technically justified as the most cost-effective and timely risk mitigation measure for this material. Therefore this material was removed for disposal as part of the RAM.

3 Release Abatement Measure Completion Report

The following subsections provide the details required of the *RAM Completion Report*, as per the referenced sections of 310 CMR 40.0446.

3.1 Description of Release, Site Conditions and Receptors (40.0446(4)(a))

3.1.1 Site Conditions and Receptors

The subject site consists of Lot 27, an approximately 1-acre parcel on the western side of Grove Street in an industrial area of Franklin, Massachusetts (Norfolk County). The property is bisected by Mine Brook, a Class B surface water body and tributary of the Charles River. The site itself is currently vacant but

adjacent properties to the north, south and east are actively operated by local industrial and commercial operations.

Soil at the subject site consists generally of fill material and gravelly sand over shallow bedrock located at approximately 10 feet below grade. The primary direction of overburden groundwater flow at the site is generally to the south, toward Mine Brook.

Prior to May 2012, the site was formerly occupied by an approximately 100-year old wood-framed mill building, originally developed as a portion of the Norfolk Woolen Mills complex around 1900. The building was later used for paint manufacture and then by Nu-Style for costume jewelry manufacture. The building was abandoned from the early 1990s to 2012 and became dilapidated. The Town Building Commissioner condemned the building in October 2005. In 2012, the Town commissioned the demolition of the building. The site is currently cleared and slopes downward from north to south toward Mine Brook.

The subject site includes a Town-owned right-of-way, called "Old Forge Hill Road," which forms the northern and western boundaries of Lot 27 of the subject site, and is approximately depicted on *Figure 2*. This right-of-way is utilized by local property owners as an access way to nearby properties.

The Town anticipates that the subject site may be redeveloped for later use by one of the neighboring industrial operations. However, the specific end use of the property has not been identified to date.

3.1.2 Description of Release

As documented in a May 2008 *Phase I Initial Site Investigation* and September 2010 *Phase II Site Assessment Report*, the site was operated between the late 1960s and approximately 1989 as a costume jewelry manufacturer. Industrial processes used at the site included electroplating and metals finishing, and chemicals used at the site included heavy metals (including nickel and chromium), acids, bases, cyanides, oils, and chlorinated solvents. Process equipment and chemicals were abandoned at the site when Nu-Style declared bankruptcy in approximately 1991, and were removed by USEPA during a CERCLA Removal Action in 1992.

Between 2007 and 2010, Fuss & O'Neill conducted environmental assessment activities at the site, and two separate release mechanisms were identified at the site:

- Metals and chlorinated VOC were identified in surface soil at the site proximal to three loading docks, located on the northeast, northwest and western sides of the former mill building. These releases were generally characterized by concentrations of metals and VOC in surface soil and overburden groundwater. Based on past environmental sampling activities, the soil releases were generally surface spills to the top three to five feet of soil at the site. The releases of metals and chlorinated VOC were identified in overburden groundwater, and chlorinated VOC were identified in shallow bedrock wells (installed into the first water-bearing fracture, typically less than 20 feet below the bedrock interface). The horizontal and vertical extents of bedrock contamination could not be evaluated without the installation of deeper bedrock wells beneath

the former building footprint and therefore, a *Phase II Comprehensive Site Assessment* has not been completed at the site to date.

Sediment in Mine Brook, which abutted the site to the south and west, contained concentrations of PAH immediately downstream of the site which exceeded the Consensus-Based TECs. Based on historic mapping, a raceway looped from Mine Brook upstream of the subject site, beneath the building on the subject site, and westward back to Mine Brook, and a portion of an underground tunnel was historically observed in the adjacent building on Lot 22. Historical documentation compiled by the Town indicated that this operation likely terminated in the 1960s during the realignment of Grove Street, and based on site conditions, the eastern end of the structure was closed by 1978, when an addition was constructed on the northeastern portion of the site. Based on the analytical data set, the approximate historical discharge location of this tunnel was identified as a potential point source of PAH to Mine Brook. During demolition activities, a buried and sealed portion of the former raceway was discovered beneath the building slab. Contaminated soil from this buried portion of the former raceway was removed and the buried raceway section was closed and backfilled during the demolition activities in order to complete the objectives of the RAM Plan.

3.2 Description of the RAM Completed at the Disposal Site (40.0446(4)(b))

The following project approach completed at the site between May 2012 and February 2013, as documented in the May 2012 RAM Plan:

- Erosion and sedimentation controls, as well as a scaffolding constructed as a debris shield, were constructed at the site in accordance with an *Order of Conditions* prepared in accordance with the *Massachusetts Wetlands Protection Act* (310 CMR 10.00).
- The Lot 27 building was demolished and components segregated for recycling and/or off-site disposal. As stated previously, the building had been abandoned and unmaintained for approximately 20 years, and was condemned by the Town Building Commissioner. Therefore, building demolition was conducted without prior abatement due to the compromised state of the structure. Prior to demolition, EnviroScience and ABW obtained waiver C-AW-12-181 authorizing demolition and subsequent segregation and disposal of building materials (including the salvage of brick, concrete, metal, and other materials where feasible to minimize waste generation).
- Clean brick, concrete and masonry materials were staged on-site for crushing and reuse in accordance with the MassDEP “Asphalt, Brick and Concrete” (ABC) reuse policy.
- Following the completion of building demolition and disposal, soil containing lead and chlorinated VOC was excavated and staged on-site. The soil was characterized for off-site disposal in accordance with the MCP, and confirmatory samples were collected at the extents of the excavation to document the post-excavation soil conditions at the site and support future risk characterization activities.
- The southern foundation wall of the former building was buttressed by a poured concrete gravity wall to retain the foundation for its historical value and generate an approximately level

site for potential future reuse. A permanent chain-link fence was constructed along the general alignment of these walls to mitigate the potential fall hazard associated with the wall height.

- The site was backfilled and stabilized using fill material imported from off-site sources in accordance with the anti-degradation standard at 310 CMR 40.0032(3).
- While not specifically documented in the original RAM Plan, a raceway tunnel beneath the demolished building was exposed and subsequently closed. Residual solids containing COC in the tunnel were excavated and disposed off-site at an appropriately licensed disposal facility. The tunnel walls were then demolished into themselves and the former tunnel alignment was backfilled along with the remainder of the former building foundation.

Demolition and remediation activities at the site were conducted by Associated Building Wreckers, Inc. (ABW) of Springfield, Massachusetts. ABW was selected by the Town in January 2012 based on a competitive public bidding process in accordance with MGL Chapter 149.

Photographs taken by Fuss & O'Neill and the Town during RAM activities are included in *Appendix A*. The specific RAM activities are detailed in the sections below:

3.2.1 Site Preparation

Prior to the commencement of demolition and remediation, ABW and its subcontractors completed the following site preparation activities:

- Placement of erosion controls, including wattles, for siltation control around the site.
- Construction of a scaffolding structure spanning Mine Brook. The scaffolding structure was constructed to prevent demolition debris from falling into Mine Brook during demolition activities.
- Installation of a lined vehicle washing station and construction entrance to limit dust migration from the site.
- Clearance from local utilities (DigSafe notification).
- Disconnection of water, sewer, electrical and gas lines from the building.
- Installation of temporary site controls, including fencing and locking gates, to prevent unauthorized vehicle access during the project.

Additionally, ABW completed a demolition permit application for local Building Commission approval.

3.2.2 Building Demolition

Building demolition activities were conducted in accordance with a *Segregation and Disposal Plan* prepared by EnviroScience. Prior to demolition, ABW completed MassDEP project notification (10-day notification) form BWP-AQ-06 and asbestos removal notification form ANF-001 for MassDEP submittal.

Demolition activities began on May 10, 2012. The final load of building demolition debris was transported off-site on June 8, 2012. All ACM handling and disposal activities were observed and monitored by a project monitor from EnviroScience. Samples were collected at the four corners (north,

south, east and west of the site twice daily for on-site polarized light microscopy (PLM) analysis to evaluate ambient air for the presence of fibers potentially attributable to the demolition activities. One sample was collected daily for transmission electron microscopy (TEM) analysis at a fixed-base analytical laboratory. Samples were additionally collected using dust track

The brick smokestack was demolished by hand immediately following the completion of building demolition and debris removal. The bricks were retained on-site for crushing and reuse as general fill material.

3.2.3 Soil and Sediment Management

3.2.3.1 Raceway Sediment

On May 21, 2012, ABW personnel demolished the northwesternmost portion of the building, which had been previously described as a slab-on-grade structure. During demolition activities, the underground raceway tunnel was discovered. The portion of the tunnel discovered at that time was a weir-controlled structure with concrete training walls, and appeared to have been specifically designed to regulate wastewater flows from the tunnel. At the time of demolition, the structure contained several inches of standing water and solid materials potentially deposited as sediment prior to the raceway beneath the building being sealed at either end. The alignment of the raceway is depicted on *Figure 2*.

On July 10, 2012, Fuss & O'Neill collected samples of the standing water and sediment-like material from the raceway to evaluate whether these materials were a continuing source of contamination at the site. Two surface water samples and two sediment samples were collected and submitted to Con-Test Analytical Laboratory for analysis of the following:

- VOC via USEPA Method 8260
- Extractable petroleum hydrocarbons (EPH) and target polycyclic aromatic hydrocarbons (PAH) via the MassDEP Method
- Metals, including the *Compendium of Analytical Methods* (CAM) target list, via USEPA Methods 6010 and 7471.

The raceway sediment material and standing water data sets are tabulated in *Tables 1 and 2*. The raceway data generally indicated that both standing water and sediment contained metals (chromium and lead) at concentrations higher than typical on-site soil and groundwater, and the concentrations of PAH in the sediment exceeded MassDEP soil standards for unrestricted reuse and were higher than typical on-site soil. Additionally, as stated previously, the analytical data set developed during the completion of the May 2008 *Phase I ISI* and September 2010 *Phase II ESA* had indicated that a point source of PAH had affected sediment quality in Mine Brook on the western side of the site, in approximately the alignment which would correspond to the former discharge point of the raceway.

In light of these conditions, the Town requested that ABW excavate and demolish the raceway, and remove the PAH-contaminated sediment for off-site disposal. ABW completed these activities in two stages:

- The western portion of the raceway, which had been exposed in May 2012, was excavated on August 20, 2012. Two truckloads, collectively totaling 44.29 tons of sediment were live-loaded for disposal at ESMI of New Hampshire, LLC. (ESMI of NH). The sediment was transported under Bill of Lading and was treated via low-temperature thermal desorption.
- The eastern portion of the raceway was exposed and demolished on January 14, 2013. Sediment from the raceway was staged on-site in a lined stockpile prior to disposal. On January 23, 2013, two truckloads of sediment collectively totaling 72.11 tons were live-loaded for disposal at ESMI of NH. The sediment was transported under Bill of Lading and was treated via low-temperature thermal desorption. Weight slips and disposal documentation are included in *Appendix B*.

The structure was observed to consist of a stone-walled channel with an arched roof, and a discharge control weir was located at the western end of the structure. Because the structure was lined in this way, it was considered a discrete volume of material and upon removal of the accessible sediment, no additional investigation was warranted during the RAM activities to evaluate potential releases from the raceway structure.

3.2.3.2 Soil Management

Following the raceway excavation activities on August 20, 2012, ABW commenced excavation of the soil containing chlorinated VOC at the site. Excavation began along the northwestern corner of the former building foundation. Approximately 60 cubic yards of soil were excavated and stockpiled on-site on August 20, 2012. Excavation ceased due to the discovery of a previously unidentified sewer line, which was apparently connected to a neighboring business, and was damaged during excavation. Fuss & O'Neill collected eight soil samples at the limits of excavation for laboratory analysis. On September 18, 2012, ABW and Fuss & O'Neill continued excavation at the northwestern portion of the site, expanding the excavation area to the north and east based on analytical data which indicated that chlorinated VOC remained in soil in this area. Fuss & O'Neill collected four additional soil samples from the extents of the excavation. Additional excavation was conducted in this area on January 8, 2013, and one additional confirmatory sample was collected at that time. The soil sample locations are depicted on *Figure 2*.

On September 18, 2012, ABW excavated soil from the vicinity of the northeastern loading dock at the site, where soil samples were previously reported to contain metals (specifically lead and total chromium) at concentrations greater than the MassDEP Method 1 soil standards. One confirmatory soil sample was collected from the excavation grave.

The B-4 excavation area, as depicted on *Figure 2*, was a historical loading dock on the western side of the building and was located adjacent to a bunker with access to the boiler room. ABW began excavation in this area on September 18, 2012. Fuss & O'Neill collected four confirmatory samples on September 18, 2012 at the limits of excavation for laboratory analysis. On January 8, 2013, ABW and Fuss & O'Neill continued excavation at the northeastern portion of the B-4 excavation area, expanding the excavation area based on analytical data which indicated that chlorinated VOC remained in soil in this area. One confirmatory soil sample was collected on January 8, 2013.

The confirmatory soil sampling program was conducted in order to confirm that the areas of soil containing VOC were significantly removed, to the extent feasible, during the completion of RAM

activities. With the exception of soil adjacent to the previously undocumented sewer line on the northern end of the property, the concentrations of metals and VOC in the confirmatory soil samples were significantly less than the concentrations identified during preliminary site investigation activities in 2007. Soil in the vicinity of the active sewer line (as well as a water line, based on Franklin DPW representations) was not excavated in order to limit potential utility interruptions.

In January 2013, the soil was accepted for disposal at ESMI of New York, Inc. (ESMI of NY). Between January 7 and 24, 2013, a total of 14 truckloads of soil collectively weighing 406.53 tons were transported under bill of lading to ESMI of NY, for low-temperature thermal desorption treatment. Weight slips and disposal documentation are included in *Appendix B*.

3.2.4 Site Restoration

ABW and its subcontractors installed a steel-reinforced concrete gravity wall, as depicted on *Figure 2*, on the interior (northern) side of the former mill foundation wall. The gravity wall was installed in order to support the weight of soil at the site in order to restore the site to a generally level, stable grade which would not be subject to excessive erosion, and which would result in a generally level site for potential future redevelopment. The gravity wall was constructed of poured concrete in four lifts. The southern foundation wall was restored to a consistent elevation using brick and concrete masonry and completed with a two-inch thick poured concrete cap.

Following the completion of demolition activities and the concrete gravity wall construction, ABW crushed brick, concrete, and masonry rubble from the demolition activities to a maximum dimension of three inches. The rubble fill was used to partially backfill the foundation hole on the southern side of the site. The remainder of the foundation hole, as well as the raceway tunnel, was filled with sand and gravel provided by the Franklin Public Works department. The fill material was generated at off-site locations which were not impacted by releases of OHM which would degrade the site contrary to the anti-degradation provisions of the MCP (310 CMR 40.0032).

3.3 Investigatory and Monitoring Data (40.0446(4)(c))

As stated above in *Section 3.2.1*, all demolition and loading activities related to ACM at the site were monitored by EnviroScience personnel and analytical samples were collected for TEM analysis once per workday, for analysis at an off-site laboratory. Samples were submitted to ESML Analytical of Woburn, Massachusetts (ESML) for TEM analysis. No asbestos fibers were detected in any of the monitoring samples at concentrations greater than the laboratory reporting limits (typical reporting limits were less than 0.005 fibers per cubic centimeter). Asbestos monitoring analytical reports are included in *Appendix C*.

Investigatory data related to the standing water and solids in the raceway are included in *Tables 1 and 2* and the analytical data are included in *Appendix D*. The raceway structure was constructed with stone liner walls and a rock base. The excavation activities resulted in the removal of all accessible sediment and therefore, confirmatory samples were not collected to document the final quality of the surrounding media.

Confirmatory soil samples were collected from the soil excavation areas. The sample locations are depicted on *Figure 2* and analytical data are tabulated in *Table 3* and included in *Appendix D*. Sample numbers which are depicted in strikeout on *Table 3* were removed during later excavation and are not representative of final soil conditions at the site. The soil data were compared to the MassDEP Method 1 S-1 / GW-2 and S-1 / GW-3 standards. Although final use of the site has not been established, these standards are conservative with respect to potential risk at the site based on potential exposure scenarios (as they apply to sites with unrestricted access where potable water use is not anticipated).

3.4 Findings and Conclusions of RAM (40.0446(4)(d))

The following conditions summarize Fuss & O'Neill's findings at the completion of the RAM activities:

- Approximately 523 tons of contaminated environmental media (soil and raceway materials) were removed from the site. Approximately 407 tons of soil containing metals and chlorinated VOC was removed from the site and disposed at ESMI of NY, and approximately 116 tons of soil/sediment material containing metals and PAH was removed from the site and disposed at ESMI of NH.
- Confirmatory soil samples collected at the extents of the soil excavations generally contained significantly lower, but detectable, concentrations of chlorinated VOC. The concentrations of PCE and TCE at the northern end of the subject site adjacent to the sewer line remain in excess of the MassDEP Method 1 S-1 soil standards, but that soil was not removed due to the presence of on-site utilities.
- A permanent solution has not been achieved to date, because of the following conditions:
 - The nature and extent of VOC in bedrock groundwater have not been characterized.
 - Groundwater which historically contained VOC at concentrations greater than the MassDEP Method 1 groundwater standards has not been documented to have attenuated to date.
 - VOC remain in soil at the northern end of the site at concentrations greater than the MassDEP Method 1 S-1 soil standards, which may warrant further evaluation. A comprehensive risk characterization incorporating the post-remediation soil data set has not been completed to date to demonstrate whether this soil warrants further remediation activities.

The RAM was implemented in order to remove sources of metals and chlorinated VOC in soil, and to eliminate point sources of contamination which had continued to impact groundwater. An additional objective of the building demolition activity was to facilitate the future installation of bedrock monitoring wells in the former building footprint in order to evaluate the nature and extent of chlorinated VOC in bedrock.

Based on the analytical data set compiled at the site, substantial amounts of soil containing VOC at concentrations greater than the Method 1 S-1 soil standards has been removed from the site. While post-removal groundwater quality has not been assessed to date, the removal of the continuing source of contamination is anticipated to improve groundwater quality at the site. Removal of the building has

3.5 Remediation Waste Management (40.0446(4)(e))

Soil and buried raceway material excavated from the areas depicted on *Figure 2* was temporarily stockpiled on-site during coordination with off-site disposal facilities. As noted above, the contaminated soil and raceway materials were disposed off-site during remediation activities. All material was transported off-site under Bills of Lading which were submitted to MassDEP prior to transport of contaminated media.

Weight slips and transport log sheets for the raceway material (sediment) and soil are included as *Appendix B*. A log sheet summary listing the pertinent shipment dates, tonnages, and weight ticket numbers is included on *Table 4*.

All remediation waste generated during RAM activities has been removed from the site and disposed off-site at appropriately licensed disposal facilities.

3.6 Ongoing Management, Maintenance, and Monitoring (40.0446(4)(f))

The RAM Plan did not propose construction of an engineered control (a cap, soil vapor extraction system, groundwater control, etc.), and therefore, no ongoing maintenance activities are proposed at the site. Permanent fencing was installed at the site to mitigate fall hazards related to the wall height in conformance with local and state building code. However, maintenance of the fencing is not required under the RAM Plan as a means to limit access to contaminated media at the site.

The activities described in the RAM, namely the removal of building components containing hazardous building materials and the excavation of soil containing metals and VOC, was completed, and closure of the underground raceway and removal of contaminated media from the raceway was completed. The excavations were backfilled and no further RAM-related activities are required.

Additional activities will be warranted in order to bring the site into compliance with the MCP. Specifically, a bedrock investigation will be warranted to evaluate the extent of chlorinated VOC in bedrock groundwater, in order to fulfill the requirements of a *Phase II Comprehensive Site Assessment* in accordance with 310 CMR 40.0830 and to evaluate and implement remedial strategies at the site. Long-term monitoring may be conducted in order to document natural attenuation in groundwater following the removal of the soil sources. However, the scope of these activities is beyond the proposed activities under the RAM.

3.7 Department-Requested Information (40.0446(8))

Additional clarifying information was requested by MassDEP during the waiver approval process for the building demolition activities. However, no additional information has been requested by MassDEP regarding the RAM to date.

3.8 Licensed Site Professional Opinion of RAM Compliance (40.0446(5))

It is the opinion of the LSP-of-Record that the RAM was conducted in accordance with the MCP and met the objectives of the previously submitted RAM Plan. No specific Department-required conditions were attached to the approval of the RAM Plan. The LSP Opinion Certification is included in the Bureau of Waste Site Cleanup Form (BWSC106) submitted to eDEP to which this document is attached.

4 References

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USDA, 2007. United States Department of Agriculture, Natural Resources Conservation Services Soil Survey Geographic (SSURGO) Data Base, accessed April 2011.

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Zen, Ean, 1983. Bedrock Geologic Map of Massachusetts; United State Department of the Interior, U.S. Geological Survey, in cooperation with the Commonwealth of Massachusetts Department of Public Works and Joseph A. Sinnott, State Geologist.

5 Limitations of Work Product

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2. The work product may contain information that is time sensitive. The work product was prepared by Consultant subject to the particular scope limitations, budgetary and time constraints and business objectives of the Client which are detailed therein or in the contract between Consultant and Client. Changes in use, tenants, work practices, storage, Federal, state or local laws, rules or regulations may affect the work product.
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5. If the purpose of this project was to assess the physical characteristics of the subject property with respect to the presence in the environment of hazardous substances, waste or petroleum and chemical products and wastes as defined in the work product, unless otherwise noted, no specific attempt was made to check the compliance of present or past owners or operators of the subject property with Federal, state, or local laws and regulations, environmental or otherwise.
6. If water level readings have been made, these observations were made at the times and under the conditions stated in the report. However, it must be noted that fluctuations in water levels

may occur due to variations in rainfall, passage of time and other factors and such fluctuations may affect the conclusions and recommendations presented herein.

7. Except as noted in the work product, no quantitative laboratory testing was performed as part of the project. Where such analyses have been conducted by an outside laboratory, Consultant has relied upon the data provided and, unless otherwise described in the work product, has not conducted an independent evaluation of the reliability of these tests.
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9. Chemical analyses may have been performed for specific parameters during the course of this project, as described in the work product. However, it should be noted that additional chemical constituents not included in the analyses conducted for the project may be present in soil, groundwater, surface water, sediments or building materials at the subject site.
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13. Any use of or reliance on the work product shall constitute acceptance of the terms hereof.

Tables

Table 1
Summary of Sediment Analytical Data
Subsurface Raceway Structure
Collected on July 10, 2012

Former Nu-Style Facility
87 Grove Street, Franklin MA

Prepared for the Town of Franklin

April 2013

	Sample Location	Raceway - West	Raceway - East	MassDEP Method 1 Soil Standards		Average Sediment Concentrations	
	Sample Number	0710-01	0710-02	S-1/GW-2	S-1/GW-3	Upstream of Raceway Discharge	Downstream of Raceway Discharge
VOC (USEPA Method 8260)	Units						
cis-1,2-Dichloroethylene	mg/kg	0.0035	0.0094	0.4	100	---	---
Tetrachloroethylene	mg/kg	0.020	0.022	10	30	---	---
Trichloroethylene	mg/kg	0.030	0.017	2	90	---	---
EPH and Target PAH (MassDEP Method)							
C9-C18 Aliphatics	mg/kg	ND < 77	ND < 87	1,000	1,000	---	---
C19-C36 Aliphatics	mg/kg	170	390	3,000	3,000	ND	20
C11-C22 Aromatics	mg/kg	800	190	1,000	1,000	ND	14
Acenaphthene	mg/kg	18	ND < 0.87	1,000	1,000	---	---
Acenaphthylene	mg/kg	1.2	ND < 0.87	600	10	ND	0.13
Anthracene	mg/kg	36	1.1	1,000	1,000	ND	0.19
Benzo(a)anthracene	mg/kg	40	2.6	7	7	ND	0.43
Benzo(a)pyrene	mg/kg	28	2.3	2	2	ND	0.49
Benzo(b)fluoranthene	mg/kg	36	3.1	7	7	ND	0.60
Benzo(g,h,i)perylene	mg/kg	14	1.5	1,000	1,000	---	---
Benzo(k)fluoranthene	mg/kg	14	1.2	70	70	ND	0.59
Chrysene	mg/kg	35	2.7	70	70	ND	0.68
Dibenzo(a,h)anthracene	mg/kg	4.4	ND < 0.87	0.7	0.7	ND	0.09
Fluoranthene	mg/kg	110	5.6	1,000	1,000	ND	1.4
Fluorene	mg/kg	21	ND < 0.87	1,000	1,000	ND	0.07
Indeno(1,2,3-cd)pyrene	mg/kg	17	1.4	7	7	ND	0.18
2-Methylnaphthalene	mg/kg	5.5	ND < 0.87	80	300	---	---
Naphthalene	mg/kg	10	ND < 0.87	40	500	---	---
Phenanthrene	mg/kg	140	5.0	500	500	ND	0.33
Pyrene	mg/kg	98	5.3	1,000	1,000	ND	1.3
Total Metals (USEPA Methods 6010/7471)							
Antimony	mg/kg	ND < 3.8	8.2	20	20	0.64	0.31
Barium	mg/kg	190	230	1,000	1,000	0.16	0.13
Beryllium	mg/kg	0.69	2.3	100	100	0.14	0.14
Cadmium	mg/kg	ND < 0.38	0.43	2	2	1.5	1.6
Chromium	mg/kg	83	120	30*	30*	3.3	7.0
Lead	mg/kg	290	380	300	300	7.6	8.6
Mercury	mg/kg	0.65	1.2	20	20	---	---
Nickel	mg/kg	12	17	20	20	1.8	5.4
Vanadium	mg/kg	8.2	11	600	600	---	---
Zinc	mg/kg	150	200	2,500	2,500	15	23

Notes:

MassDEP: Massachusetts Department of Environmental Protection

USEPA: United States Environmental Protection Agency

VOC: volatile organic compounds

EPH: extractable petroleum hydrocarbons

PAH: polycyclic aromatic hydrocarbons

ND < X: Not detected above laboratory reporting limit

"Upstream of Discharge" is the average of the analytical data from sediment samples collected from locations SD-2, SD-3 and SD-4 during Phase II assessment activities. "Downstream of Discharge" is the average of data from sample locations SD-1, SD-5, SD-6 and SD-7. Refer to Fuss & O'Neill's *September 2010 Phase II Site Assessment Report* for the sediment analytical data. "ND" indicates that the reported concentrations in sediment samples were below laboratory reporting limits.

---: not calculated due to limited available data

mg/kg: milligrams per kilogram

Only the last six digits of the sample numbers are listed.

Bold and shaded values exceed one or more of the regulatory criteria.

*: Conservatively assumes chromium is in hexavalent form.

Created by: DCL

Checked by: SAH

Table 2
Summary of Surface Water Analytical Data
Subsurface Raceway Structure
Collected on July 10, 2012

Former Nu-Style Facility
87 Grove Street, Franklin MA

Prepared for the Town of Franklin
April 2013

	Sample location	Raceway - West	Raceway - East	MassDEP Method 1 Groundwater Standards	
				GW-2	GW-3
Field Measurements	Units				
pH	pH units	6.69	6.39	NE	NE
Specific Conductance	µS/cm	1561	1522	NE	NE
Temperature	°C	25.2	20.8	NE	NE
Dissolved Oxygen	mg/L	4.89	5.60	NE	NE
ORP	mv	-15.7	-44	NE	NE
VOC (USEPA Method 8260)					
cis-1,2-Dichloroethylene	µg/L	2.3	3.4	100	50,000
EPH with Target PAH (MassDEP Method)					
C9-C18 Aliphatics	µg/L	ND < 100	160	5,000	50,000
C19-C36 Aliphatics	µg/L	320	210	NE	50,000
C11-C22 Aromatics	µg/L	120	ND < 100	50,000	5,000
Acenaphthene	µg/L	ND < 2.0	ND < 2.0	NE	6,000
Acenaphthylene	µg/L	ND < 2.0	ND < 2.0	10,000	40
Anthracene	µg/L	ND < 2.0	ND < 2.0	NE	30
Benzo(a)anthracene	µg/L	ND < 2.0	ND < 2.0	NE	1,000
Benzo(a)pyrene	µg/L	ND < 2.0	ND < 2.0	NE	500
Benzo(b)fluoranthene	µg/L	ND < 2.0	ND < 2.0	NE	400
Benzo(g,h,i)perylene	µg/L	ND < 2.0	ND < 2.0	NE	20
Benzo(k)fluoranthene	µg/L	ND < 2.0	ND < 2.0	NE	100
Chrysene	µg/L	ND < 2.0	ND < 2.0	NE	70
Dibenzo(a,h)anthracene	µg/L	ND < 2.0	ND < 2.0	NE	40
Fluoranthene	µg/L	ND < 2.0	ND < 2.0	NE	200
Fluorene	µg/L	ND < 2.0	ND < 2.0	NE	40
Indeno(1,2,3-cd)pyrene	µg/L	ND < 2.0	ND < 2.0	NE	100
2-Methylnaphthalene	µg/L	ND < 2.0	ND < 2.0	2,000	20,000
Naphthalene	µg/L	ND < 2.0	ND < 2.0	1,000	20,000
Phenanthrene	µg/L	ND < 2.0	ND < 2.0	NE	10,000
Pyrene	µg/L	ND < 2.0	ND < 2.0	NE	20
Total Metals (USEPA Methods 6010/7471)					
Antimony	µg/L	1.7	1.4	NE	8,000
Arsenic	µg/L	1.3	0.85	NE	900
Barium	µg/L	150	140	NE	50,000
Beryllium	µg/L	0.82	1.1	NE	200
Chromium	µg/L	21	21	NE	300*
Lead	µg/L	63	70	NE	10
Mercury	µg/L	0.48	0.17	NE	20
Nickel	µg/L	13	13	NE	200
Zinc	µg/L	60	55	NE	900

Notes:

MassDEP: Massachusetts Department of Environmental Protection

USEPA: United States Environmental Protection Agency

VOC: volatile organic compounds

EPH: extractable petroleum hydrocarbons

PAH: polycyclic aromatic hydrocarbons

ND<X: Not detected above laboratory reporting limit

Only the last six digits of the sample numbers are listed.

Bold and shaded values exceed one or more of the regulatory criteria

*: Conservatively assumes chromium is in hexavalent form.

NE: not established

Created by: DCL

Checked by: SAH

mg/L: milligrams per liter

µg/L: micrograms per liter

ORP: oxidation-reduction potential

ntu: nephelometric turbidity units

°C deg: degrees Celsius

µS/cm: microsiemens per centimeter

mv: millivolts

GW: groundwater

Table 3
Summary of Confirmatory Soil Sample Analytical Data
Excavation Areas

Former Nu-Style Facility
87 Grove Street, Franklin MA
Prepared for the Town of Franklin

April 2013

Sample Location	Northwest Corner Excavation Area													Average of Remaining Soil in Northwest Corner	Average of Remaining Soil Outside of Sewer Line Area	MassDEP Method 1 Soil Standards		
	Sample Number	1028120820-01	1028120820-02	1028120820-03	1028120820-04	1028120820-05	1028120820-06	1028120820-07	1028120820-08	1028120918-01	1028120918-02	1028120918-03	1028120918-04			1028130108-01	S-1/GW-2	S-1/GW-3
	Sample Depth (ftb)	2-3	5-6	0-2	5-6	0-1.5	3-4	0-1.5	3-4	3-4	0-2	0-2	3-4			0-3		
Sample Date	8/20/2012	8/20/2012	8/20/2012	8/20/2012	8/20/2012	8/20/2012	8/20/2012	8/20/2012	9/18/2012	9/18/2012	9/18/2012	9/18/2012	1/8/2013					
VOC (USEPA Method 8260/5035)	Units																	
1,1,1-Trichloroethane	mg/kg	ND < 0.0020	ND < 0.0027	ND < 0.0019	ND < 0.0023	ND < 0.0021	ND < 0.0016	ND < 0.0012	ND < 0.0019	ND < 0.0022	ND < 0.0022	ND < 0.0021	ND < 0.0018	ND < 0.0028	0.002	0.002	500	500
Tetrachloroethylene	mg/kg	0.031	0.14	ND < 0.0019	0.18	0.44	0.37	0.28	2.0	0.029	0.23	0.12	0.0068	0.11	2.6	0.29	10	30
Trichloroethylene	mg/kg	0.038	0.012	ND < 0.0019	0.017	0.44	0.37	0.28	0.9	0.033	0.23	0.11	0.0023	0.046	1.8	0.13	2	90

Sample Location	Northeast Corner			B-4 Hot Spot			Average of Remaining Soil Around B-4	MassDEP Method 1 Soil Standards		
	Sample Number	1028120918-05	1028120918-06	1028120918-07	1028120918-08	1028120918-09		1028130108-02	S-1/GW-2	S-1/GW-3
	Sample Depth (ftb)	5-6	6-7	0-2	0-2	0-2		0-3		
Sample Date	9/18/2012	9/18/2012	9/18/2012	9/18/2012	9/18/2012	1/8/2013				
VOC (USEPA Method 8260/5035)	Units									
1,1,1-Trichloroethane	mg/kg	NA	ND < 0.0024	ND < 0.0021	0.0028	0.012	ND < 0.0010	0.004375	500	500
Tetrachloroethylene	mg/kg	NA	0.034	0.0023	0.22	ND < 0.0021	ND < 0.0010	0.010	10	30
Trichloroethylene	mg/kg	NA	0.011	ND < 0.0021	0.22	ND < 0.0021	ND < 0.0010	0.00405	2	90
Total Metals (USEPA Methods 6010/7471)	mg/kg	ND < 2.6	NA	NA	NA	NA	NA	NA	20	20
Antimony	mg/kg	31	NA	NA	NA	NA	NA	NA	1,000	1,000
Barium	mg/kg	ND < 0.26	NA	NA	NA	NA	NA	NA	100	100
Beryllium	mg/kg	ND < 0.26	NA	NA	NA	NA	NA	NA	2	2
Cadmium	mg/kg	7.3	NA	NA	NA	NA	NA	NA	30*	30*
Chromium	mg/kg	42	NA	NA	NA	NA	NA	NA	300	300
Lead	mg/kg	ND < 0.026	NA	NA	NA	NA	NA	NA	20	20
Mercury	mg/kg	5.7	NA	NA	NA	NA	NA	NA	20	20
Nickel	mg/kg	18	NA	NA	NA	NA	NA	NA	600	600
Vanadium	mg/kg	33	NA	NA	NA	NA	NA	NA	2,500	2,500
Zinc	mg/kg				NA	NA	NA	NA		

Notes:
 MassDEP: Massachusetts Department of Environmental Protection
 USEPA: United States Environmental Protection Agency
 VOC: volatile organic compounds
 ND < X: Not detected above laboratory reporting limit
 NA: not analyzed
 mg/kg: milligrams per kilogram
 Slashed cells represent soil removed during later excavation.
 Bold and underlined values exceed one or more of the MassDEP Method 1 S-1 soil standards
 *: Conservatively assumes chromium is in hexavalent form.
 ftb: feet below grade

Created by: DCL
 Checked by: JLC

Table 4
 Summary of Material Disposal Activities
 Raceway Sediment and PCE-Contaminated Soil

Former Nu-Style Facility
 87 Grove Street, Franklin MA

Prepared for the Town of Franklin
 April 2013

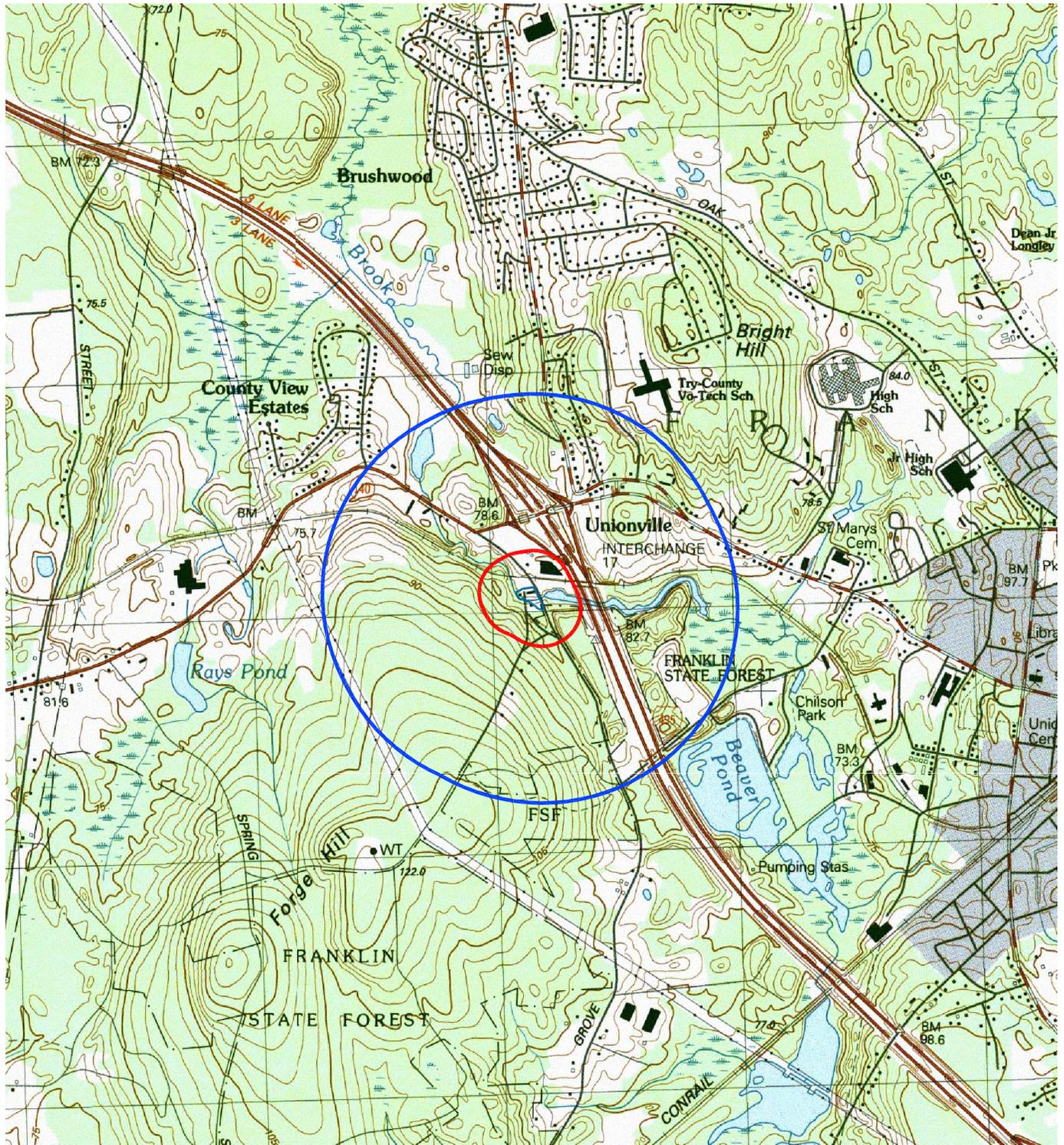
PCE-Contaminated Soil			
Facility	Ticket Number	Date	Tonnage
NY	2058328	1/7/2013	23.35
NY	2058329	1/7/2013	27.65
NY	2058330	1/7/2013	32.47
NY	2058331	1/7/2013	34.62
NY	2058332	1/7/2013	32.81
NY	2058338	1/8/2013	30.94
NY	2058339	1/8/2013	29.33
NY	2058340	1/8/2013	27.16
NY	2058343	1/8/2013	36.47
NY	2058396	1/23/2013	32.03
NY	2058397	1/23/2013	25.84
NY	2058398	1/23/2013	29.03
NY	2058407	1/24/2013	19.88
NY	2058408	1/24/2013	24.95
Subtotal			406.53
Raceway Sediment			
Facility	Ticket Number	Date	Tonnage
NH	276822	8/20/2012	24.49
NH	276823	8/20/2012	19.80
NH	281530	1/23/2013	36.97
NH	281531	1/23/2013	35.14
Subtotal			116.40
Net Tonnage			522.93

Notes:

All material was disposed at facilities operated by Environmental Soil Management, Inc. (ESMI). Facilities are located in Loudon, New Hampshire (NH) and Fort Edward, New York (NY).

"Net Tonnage" is the sum of tonnages disposed at ESMI of NH and ESMI of NY.

Figures



MAP REFERENCE

THIS MAP WAS PREPARED FROM USGS TOPOGRAPHIC QUADRANGLE IMAGES, FRANKLIN, MASSACHUSETTS © 1995 MASSGIS, ORIGINAL MAP PUBLICATION DATE: 1987
 SOURCE: OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

LEGEND

-  500 FOOT RADIUS
-  1/2 MILE RADIUS
-  APPROXIMATE SUBJECT PROPERTY BOUNDARY



SCALE:	
HORZ.:	1" = 2000'
VERT.:	
DATUM:	
HORZ.:	
VERT.:	
	
GRAPHIC SCALE	



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TOWN OF FRANKLIN
 SITE LOCATION MAP

FORMER NU-STYLE FACILITY

87 GROVE STREET

FRANKLIN, MASSACHUSETTS

PROJ. No.: 20050458.F30
 DATE: FEBRUARY 2011

FIGURE 1

Appendix A

Site Photographs

**Site Photographs
Former NuStyle Facility
Franklin, Massachusetts
Taken March 2012 – March 2013**



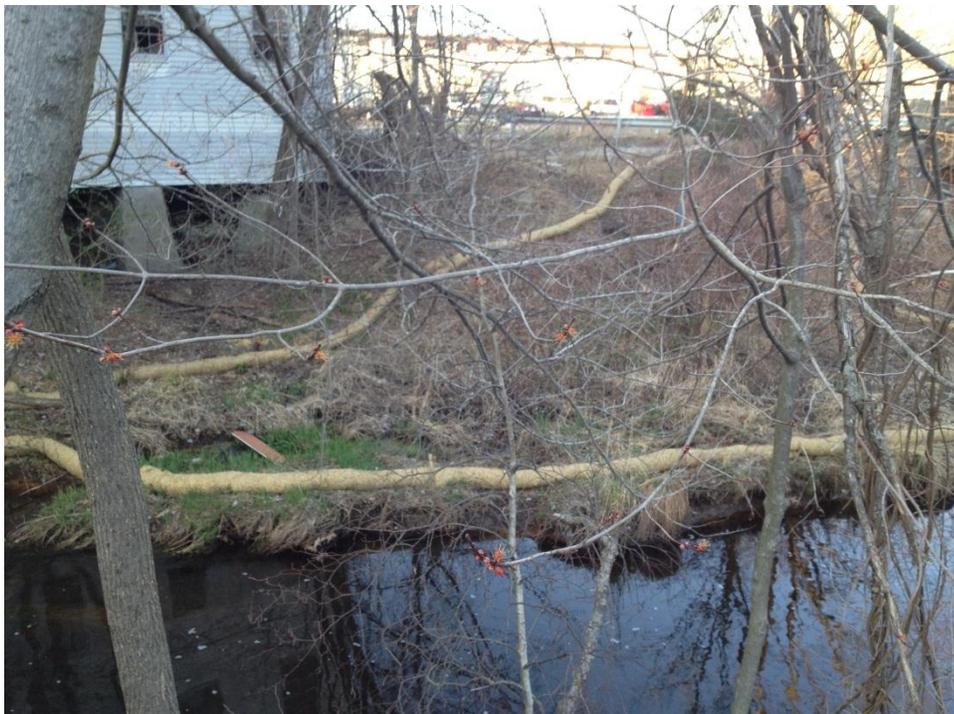
The work was conducted in accordance with an Order of Conditions



Truck wash pad installation



A scaffolding structure was used to prevent falling debris from impacting wetlands



Erosion controls installed along Mine Brook



The property was fenced to prevent unauthorized access



Building demolition



Building demolition (continued)



The chimney was demolished by hand and bricks were pulverized for fill



The scaffolding was dismantled after the overhead project work was completed



The raceway tunnel when initially exposed



The raceway ended inside the basement of the Lot 22 building (bottom left)



The excavation in the northwest corner of the site



The repaired sewer line, which limited the excavation along the northern property line



Backfilling the northwest excavation area



Restoration of the brick masonry wall façade



Installation of the concrete form work for the gravity wall



The cast-in-place concrete gravity wall behind the foundation façade



The foundation wall was capped with a poured concrete cap



The finished exterior foundation wall and fence



The site at substantial completion